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THEMATIC CLUSTER: THE FUTURE OF FACTS IN
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Traceable futures: the political temporality of forest facts in Peru's tropical logging governance

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ABSTRACT

In Loreto, Peru's largest Amazonian region, forest transport permits (or FTP) are the privileged accounting infrastructures by which the Peruvian state seeks to bring transparency to logging by making tropical timber traceable, thus securing its legality and sustainability in a context of rising national and international concern with tropical rainforests. But while FTP are often imagined as a means to secure a future where traceable forest facts can be established with certainty, they have also been enduringly suspected as artifacts prone to manipulation and deceit. In this article, I follow FTP as a way to explore the political temporality of forest facts in Peru's tropical rainforests. I argue that foregrounding the ambivalent ontologies of FTP as both reliable accounting infrastructures and treacherous manipulable things allows us to appreciate the ways in which the past and the future are articulated in conflicting ways in the context of massive technocratic innovations in the governance of Peru's tropical logging. By focusing on the political lives of a humble paper document, I thus examine how traceability becomes a fundamental condition of facticity as emerging regimes of global environmental governance drive the expansion of state data infrastructures onto previously untraceable terrains.

Futuros rastreáveis: a temporalidade política dos fatos florestais na governança da extração de madeira tropical peruana

RESUMO

Em Loreto, a maior região amazônica do Peru, as licenças de transporte florestal (ou LTF) são infraestruturas contabilísticas privilegiadas através das quais o Estado peruano procura trazer transparência à exploração madeireira, tornando a madeira tropical rastreável e garantindo assim a sua legalidade e sustentabilidade num contexto de um aumento da preocupação nacional e internacional com as florestas tropicais. Porém, embora as LTF sejam frequentemente imaginadas como meios para

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PALABRAS CLAVE

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del bosque; trazabilidad

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garantir um futuro onde fatos florestais rastreáveis possam ser estabelecidos com certeza, elas também são persistentemente suspeitas de serem artefatos propensos à manipulação e fraude. Neste artigo, sigo as LTF como uma forma de explorar a temporalidade política dos fatos florestais nas florestas tropicais do Peru. Argumento que colocar em primeiro plano as ontologias ambivalentes das LTF como infraestruturas contábeis confiáveis e, simultaneamente, como coisas manipuláveis e traiçoeiras, nos permite apreciar as maneiras pelas quais o passado e o futuro são articulados de maneiras conflitantes num contexto de inovação tecnocrática massiva na governança da indústria madeireira tropical no Peru. Ao focar na vida política de um singelo documento de papel, examino como a rastreabilidade se torna uma condição fundamental da facticidade à medida que regimes emergentes da administração ambiental global promovem a expansão das infraestruturas de dados estatais em terrenos anteriormente não rastreáveis.

Futuros trazables: la temporalidad política de los hechos del bosque en la gobernanza de la extracción maderera tropical peruana

RESUMEN

En Loreto, la región amazónica más extensa del Perú, las guías de transporte forestal (o GTP) constituyen infraestructuras de contabilidad prominentes por las que el Estado peruano aspira a traer transparencia a la extracción maderera, haciendo así la madera trazable y asegurando su legalidad y sostenibilidad en un contexto de creciente preocupación nacional e internacional por el futuro de los bosques tropicales. Pero si bien las GTP son usualmente imaginadas como medios para garantizar un futuro en donde la trazabilidad de los hechos del bosque pueda ser establecida con certeza, estas también han sido objeto de numerosas sospechas en tanto artefactos proclives a ser manipulados y usados engañosamente. En este artículo, sigo a las GTP a fin de explorar la temporalidad política de los hechos del bosque en la gobernanza forestal del Perú actual. Argumento que poner de relieve la ambivalencia ontológica de las GTP como infraestructuras de contabilidad confiables y, simultáneamente, como objetos traicioneros y manipulables, nos permite apreciar cómo el pasado y el futuro se articulan de formas conflictivas en un contexto de masiva innovación tecnocrática en la gobernanza de la industria maderera peruana. Así, examino cómo la trazabilidad se ha vuelto una condición fundamental de facticidad al tiempo que regímenes emergentes de gobernanza ambiental global guían la expansión de infraestructuras de datos estatales hacia terrenos previamente intrazables.

1. The scattered papers upon Teran's desk

The first time I met Teran was on a rainy day of 2019, a few weeks after he was appointed head of the Forestry Bureau of Loreto, Peru's largest Amazonian region. Located in an improvised plywood construction next to the main building of Loreto's regional government, his office lay at the end of a very long line of poorly ventilated cubicles populated

by noisy fans and old stationary computers. Prior to our meeting, a common acquaintance had told me that Teran had previously worked for local sawmills that were widely known to be involved in the harvesting of illegal timber in Loreto. And yet, he was now in charge of securing the legal origin of all tropical timber circulating across Loreto's tropical timber supply chains. "Unfortunately, today I cannot yet go to my governor's office and tell him something as simple as 'last year Loreto harvested 240,000 cubic meters (m³) of timber.' We just do not know," he told me, as he moved away the papers that lay scattered upon his desk. "Our data systems have collapsed, numbers are unreliable, calculations are made wrong. But soon, my friend, we will know exactly how much timber is harvested and traded in Loreto. And we will know for sure where it is coming from."

Teran's hopeful invocation of the future was premised upon an imagined historical rupture in the conditions by which facts about the tropical rainforest are constituted in the region's tropical logging governance. In Loreto, official numbers reporting the overall quantities of tropical timber being harvested, transported, and traded across the region have enduringly been objects of widespread skepticism. *Guías de transporte forestal* (forest transport permits, or FTP,) the same paper documents that lay scattered upon Teran's desk as we spoke, are the immutable mobiles whose official role is to enable state authorities to keep track of the timber volumes moving across Loreto's tropical timber supply chains (see Latour 1986). By subjecting remote logging operations in the tropical rainforest to the systematic monitoring of Loreto's Forestry Bureau and other state institutions, FTP's vital task is to render the movements and transformations of tropical timber into traceable forest facts. And so, they aim to establish a technolegal regime where legal logging operations can be distinguished from illegal ones, and where the state can regulate tropical rainforests according to emerging transnational principles of transparency and sustainability (Figures 1–5).

Such rendering involves a series of effective transformations in the ways tropical timber is understood and followed across time and space. Once trees are spotted by loggers in the rainforest and formal requests are submitted to state authorities for their felling, the petitions made by loggers must render trees into abstract timber volumes expressed in cubic meters that can be easily listed and aggregated at various scales. And so, as Teran and other state officials authorize logging operations, they do not sanction the felling of *this* or *that* physical tree, but rather grant a legal right to mobilize an abstract timber volume whose legality is a function of its attachment to a verifiable point of origin in space: a particular geotagged location in the rainforest. As trees are subsequently felled and timber is transported, transformed, and traded across logging campsites, rivers, ports and sawmills, such rendering of trees into abstract timber volumes allows timber to become traceable as a commensurable substance amenable to be aggregated, calculated, and monitored at various scales, from the microscale of individual logging operations to the mesoscale of Teran's regional productivity assessments and all the way up to the planetary scale of tropical timber trade monitoring platforms. The tropical rainforest thus becomes a computable space where timber volumes can be traced back and forth, from the moment a tree is felled to their ultimate processing and commercialization.

And yet, if the traceability of modern bureaucracy is conventionally associated to the file and its organized management (Riles 2006; Vismann 2008), the piles of FTP accumulating upon Teran's desk resonate with the untraceability that has been historically associated to Amazonian rainforests as an unruly internal frontier of the modern Peruvian state



Figure 1. Piles of documents in Loreto's Forestry Bureau (photo by author).

(Barclay and Santos Granero 2000; Walker 1987). For as loggers move timber consignments through rivers and streams until they reach the sawmills where timber is to be processed, the handling of FTP has often been associated to a vast array of deceptive practices of misreporting, duplication, and alteration that aim to trick authorities by making timber coming from unauthorized operations look as if it had a legal origin. In such a way, FTP become treacherous and manipulable evocations of an intractable

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16- Nº 000086

LISTA DE TROZAS

SERIE: 001 DEL 000001 AL 000100

N°	Especie (Nombre Común)	Codificación	Dimensiones (1)			Volumen m ³
			d1 (2)	d2 (3)	d3 (4)	
1	CUMALA	T-01	81		5.0	2.572
2			80			2.313
3			76			2.268
4			78			2.389
5			79			2.451
6			88			3.041
7			73			2.093
8			68			1.816
9			79			2.451
10			81			2.577
11			71			1.980
12			72			2.036
13			79			2.451
14			80			2.513
15			71			1.980
16			60			1.414
17			88			3.041
18			46		5.0	0.831
19			80		6.0	3.016
20			71			2.396
21			76			2.322
22			75			2.657
23			71			2.396
24			49			1.131
25			68			2.179
26			86			3.485
27			78			2.867
28			79			2.941
29			80			3.016
30			80		6.0	3.016
31			71		4.0	1.584
32			72			1.629
33			79			1.961
34			80			2.011
35			71			1.584
36			60			1.131
37			88			2.433
38			68			1.453
39			79			1.961
40	CUMALA	T-40	81		4.0	2.061
TOTAL						90.006

(1) Puedo ser las dimensiones de trozas o cuarterones
(2) Diámetro mayor (cuando se trate de trozas) o Espesor (cuando se trate de cuarterones)
(3) Diámetro menor (cuando se trate de trozas) o Ancho (cuando se trate de cuarterones)
(4) Largo (cuando se trate de trozas y cuarterones)
(5) La numeración será la misma que la guía de Transporte Forestal de Productos al estado Natural.

ORIGINAL INRENA - SEDE
COPIA 1 INRENA - 1ER. CONTROL
COPIA 2 RECEPTOR
COPIA 3 EMISOR

COPIA Y ALGO MÁS S.R.L.
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Figure 2. Example of an FTP (photo by author).

past, their untrustworthiness persistently interrupting their ideal role as the reliable infrastructures of a traceable tropical rainforest.

Today, the threat of such interruption is becoming the subject of intense national and international concerns. As the global environmental crisis turns the protection of Amazonian rainforests into a matter of increasing planetary importance, Teran's hopeful vision for the future relies on a displacement of the skepticism associated to FTP in order to



Figure 3. Indigenous workers pull timber into the riverbank near an unauthorized logging campsite (photo by author).

render even the most remote corners of Loreto's tropical rainforests into spaces of fine-grained technocratic legibility. Drawing on a longstanding technocratic enthusiasm with information as a dematerialized mode of control (Hayles 1999; Hetherington 2012), Teran's technocratic vision of the future imagined the very same FTP that lay scattered upon his desk as the reliable accounting infrastructures that will allow forest facts to be traceable both at the level of specific logging operations (how much timber volumes are being harvested, and where) and at the aggregate level of all of Loreto (how much tropical timber is being produced in the whole region). The reliability of such future forest facts is premised upon the development of a data ecosystem where FTP will be successfully recast as reliable bits of quantified information that seamlessly flow into centers of calculation. Both messy and disorganized, and potentially ordered and tractable, the scattered papers upon Teran's desk thus insinuate a particular way of framing the temporal transit from an untraceable past into the promise of a traceable future.

In this paper, I suspend ontological statements about FTP as either reliable accounting infrastructures or as treacherous manipulable things. Instead, I emphasize their ontological ambivalence as a way to think about the political temporality of forest facts in Peru's tropical rainforests. I take recent transformations in the accounting infrastructures of Loreto's tropical logging governance as a privileged site where to appreciate the articulation of such emerging political temporality. As devices that figure prominently in the arithmetic exercise of aggregating individual logging operations into a regional hyperfact accounting for Loreto as a whole, following the ambivalent lives of FTP allows us

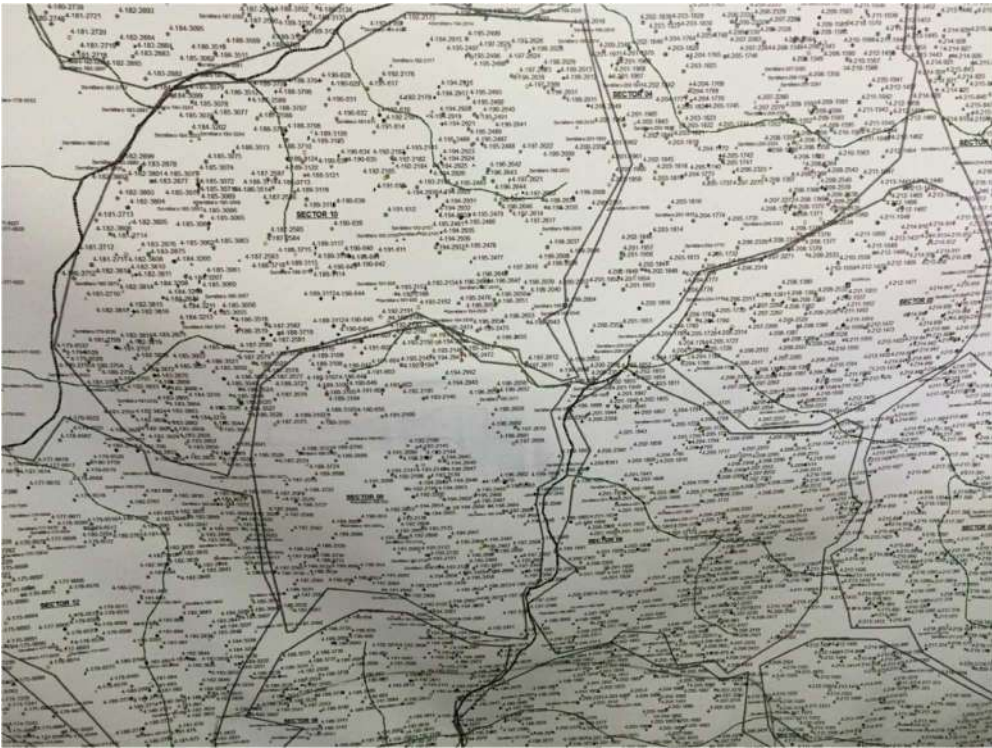


Figure 4. A forest of traceable points (photo by author).

to consider the emerging politics of forest facts at a time perfused by the calculational anxieties of the global environmental crisis.

I argue that what FTP are in such context is evocative of particular ways of articulating the past and the future. On the one hand, FTP become suspicious artifacts that resonate with the legacies of intractable pasts that are nostalgically longed by some loggers and overtly rejected by state technocrats. On the other hand, FTP are imagined as largely released from such legacies, as state technocrats envision them as the foundations for a future technolegal regime that secures the legality and sustainability of Peru's tropical logging industry. By foregrounding the ontological instability of FTP, I consider how the very ambivalence of accounting infrastructures can throw light upon larger political and historical transitions in the way facts are stabilized in Amazonia and other parts of Latin America.

Sticking to the ontological ambivalence of FTP also allows us to complicate the teleologies associated to emerging regimes of global environmental governance today. Both in Amazonia and elsewhere, the urgency of climate change is leading to a radical transformation of environmental data infrastructures where past intractabilities are to give way to transparency and accountability via massive technocratic investments. In the narratives advanced in the context of many of such interventions, technological and institutional reforms articulate a historical narrative of techno-optimistic rupture and succession, where environmental data infrastructures may yield more reliable and precise forms of environmental monitoring and decision-making (Archer 2021; Gabrys 2020; Goldstein



Figure 5. Umberto looks for answers in an Indigenous community with documents under his arm (photo by author).

and Nost 2022; Nost and Colven 2022). But if political temporality means the propagation of particular articulations of history in order to naturalize certain pasts and render particular futures inevitable (Hetherington 2016; Povinelli 2011, 3), foregrounding ambivalence rather than discrete succession might help us to appreciate that pasts and futures do not succeed each other, but actually coexist in the lives of even humble pieces of documentation. Teran himself might be a testimony of such complicated temporalities. As somebody with prior attachments to illegal logging, he is now the regional spokesperson for a novel technolegal regime committed to transparency and sustainability. His own biography, in this way, comes to be troubled by the temporal tension between conflicting pasts and futures. By complicating the teleologies cultivated in today's global environmental governance, this paper problematizes how we may imagine the future of facts in Latin America, where pasts associated to illegality and deceit may converge and collide in various ways with emerging dreams of technocratic transparency and accountability.

In order to grasp the tensions associated with the social lives of FTP, this paper draws on 24 months of ethnographic and archival fieldwork in Loreto, a region that has recently become an epicenter of technocratic interventions aiming to reform Peru's tropical logging governance at various scales. During the course of my fieldwork, FTP were usually present at the fringes of many ethnographic scenes I registered, manifesting as nonhuman companions involved in a variety of mundane practices related to timber harvesting and industrial accounting, state technolegal supervision, and inscrutable networks of legal evasion and manipulation. As I encountered FTP accumulating upon bureaucratic desks like Teran's, piling up over the floors and shelves of state offices, or being handled by state supervisors or timber tradespeople across ports, villages, and logging campsites, I also came to notice the different ways in which people talked about and referred to them, thus associating their social lives with contrasting political projects, ethical commitments, and temporal horizons. Moving FTP from the scaffoldings of practical life to the centerstage of ethnographic inquiry reveals them as privileged prisms where to appreciate the convoluted temporalities that emerge today as forest facts are reorganized in the context of global environmental governance.

In what follows, I examine the political lives of FTP over the last two decades, a period that I associate with the historical rise of Amazonia as a critical site of technocratic intervention in the context of climate change and biodiversity loss. As Loreto's tropical logging governance became a widespread international concern due to the massive (albeit largely untraceable) levels of unauthorized timber being harvested in the region, I show how FTP were envisioned as means to bring legibility to tropical rainforests by making each FTP the testimony of a traceable volume of timber moving across Loreto's tropical timber supply chains. And yet, I also show how at every step of the way, the possibility of treacherous manipulation enduringly complicated the possibility of FTP to bring such traceable forest facts into being. For as the FTP scattered upon Teran's desk show us, efforts to bring transparency to the accounting infrastructures of Loreto's tropical logging governance have enduringly been haunted by the various modes of trickery, deceit, and miscommunication that have historically grown around them.

2. The reality of the forest

When I was a kid, the days in the forest (*monte*) began very early in the morning. Before 4:00 am we were all already awake. One hour before, the cook would begin to prepare the meat that the hunter (or *montarás*, roughly translatable as forest walker) had brought to the campsite the day before. She then served it for us along with manioc flour (*farinha*), pasta, beans and canned fish. The first stage of our long work was to prepare all of the trees that had been previously identified near the stream by carefully cleaning the bushes in the area where the trees were expected to fall. And so, we conducted a hard and restless work that spanned several weeks, without communication, at a weeklong distance from the nearest town, and constantly exposed to accidents, mosquitoes, and serpents. The logs, whose diameter was many times greater than the height of the people that pushed them, were moved little by little until they reached the edges of the nearest "dry" stream. Once there, we awaited. Sometimes, rain took several days to come. But once it did, rainwater started flowing through the "dry" streams, and everybody started pushing and pulling the logs in order to move them inside the stream and towards the places where permanent water could be found. This task demanded special care in order to not be crushed by a log due to a slip in the mud or to the speed in the water flow. A lot of times, water only lasted a

couple of hours, and then one had to wait again. Other times, the whole area would get flooded (*tahuampeada*), and logs ended up incrustated into the walls of the stream. It was only after several weeks, when all logs had been spurred into the main river, that we could tie the logs together in order to form a raft, and a group of us started the long journey towards the sawmills where timber would be processed.

David shared with me these childhood memories as we sat together in his backyard one sunny afternoon in Iquitos, Loreto's capital city. His father, a well-known retired tradesperson in Loreto, used to own a small sawmill that, for a time, had become a major timber processing center in the lower Amazon river. Instead of buying timber from extractors authorized by the state, David reminisced how back in the day his father would use *habilitación*, an advancement in money and goods, in order to bond the work of Indigenous families who, in the wake of the rainy season (*tiempo de creciente*), would normally approach his sawmill in order to offer themselves as (unauthorized) timber harvesters. As a child, David occasionally joined his father while traveling with these Indigenous brigades to remote areas of the rainforest, where he got to know the family business more closely. "Back in the day, my father used to have thirty of these deals at the same time," David told me, as he scarred off a cloud of mosquitos. "We used to receive *habilitación* too from larger timber companies based in Iquitos. They would give us a million soles (the Peruvian national currency) and then we would distribute that amount amongst our networks of *habilitados*."

Already a man in his forties by the time we met, David's memories capture the untraceable rhythms and hierarchical socialities that informed the vastly unauthorized and exploitative tropical timber industry that developed across Loreto during the late twentieth century. In those years, dozens of timber tradespeople like David's father made a living by serving as local middlemen in the development of a robust network of moral and economic obligations based on *habilitación* relations across the region. By delegating the labor of scouting, marking, harvesting, and transporting timber to legions of Indigenous workers who risked their lives venturing into the rainforest for weeks or even months, networks of *habilitación* efficiently connected the most remote regions of the Amazonian rainforest with the extractive hubris of urban sawmills where timber was to be brought, processed, stored, and traded. And so, *habilitación* relations became, during the late twentieth century, the privileged means by which the extractive capital tied to the tropical logging industry could expand and thrive across the tropical rainforests of Loreto.

Importantly, if *habilitación* relations connected the rainforest and the sawmill through the material circulation of tropical timber, they were also founded on an epistemic gap between the two that reinforced a longstanding vision of Amazonian rainforests as sites that lay radically outside the scope of technocratic legibility. "I understand all the efforts that the state is doing today to secure the legal origin of tropical timber," David told me with an ironic tone, "but truth is that the reality of the forest (*la realidad del monte*) cannot be known from a desk." In drawing a contraposition between life in the tropical rainforest and the realm of document-based technocratic information, David's words resonated with an enduring vision of Amazonia as a region that resists the production of traceable facts amenable to be registered and supervised at a distance. Much in line with Peruvian historian Raúl Porras Barrenechea's 1942 assertion that "the Amazon is still a land without a stable geography and history (...) where the footprint of man disappears (...) with greater ease than the sea comes to erase inscriptions in

the sand," David's *realidad del monte* alluded to a world that was radically untraceable, and where the aspiration to establish traceable facts was interrupted by shifting labor conditions, large geographical distances, and the hierarchical and exploitative socialities of *habilitación* (see Porras Barrenechea 1961).

In such a way, David's words reminisced the conditions by which, up until the end of the twentieth century, traceable forest facts about Loreto's tropical logging industry were impossible aspirations, as *la realidad del monte* would persistently emerge as a space counterposed to state data infrastructures. As a margin of the state where the ideal certainty of law and order became vulnerable to the powers of skillful improvisation (see Das and Poole 2004), David's memories portrayed an excess reality saturated by a hyper-masculine joy stemming from hard work, danger, and humor, where the promise of a structured plan gave way to contingent discovery and wandering, and where unpredictable rains could dramatically and irreversibly affect the rhythms of everyday labor. In such celebration of improvisation and contingency, David also conveniently set himself both as the intimate protagonist and the exploitative benefactor of such reality. As somebody who cultivated a selective intimacy with the untraceable practices of logging, he claimed legitimacy in speaking on behalf of such reality. But, at the same time, his own status as the former child of an *habilitador*, as somebody who could choose to participate in such world rather than be forced to it, fed into his nostalgic fantasies about a world rivaled with any external form of legal and political control.

But despite David's nostalgic longing for such purified world, logs were not fully independent from the powers of documentation. For once they floated out of the rainforest and began their long trip to the sawmills and warehouses where they were processed and traded, timber tradespeople like David needed to simulate the legality of their activities through the savvy manipulation of different kinds of state documents. Since each timber consignment was to be supported by official declarations where loggers committed to harvest trees within authorized areas, documents were necessary as simulated means to bestow an aura of legality upon the tropical timber trade. And so, while timber tradespeople acquired tropical timber by means of untraceable *habilitación* relations, the unauthorized origins of such consignments had to be systematically dissimulated via the material production of sketch maps and listed volumes that would be untraceable back to the trees and places they referred to (see Dourojeanni 2009, 309). "At the time, it was just paper," David told me with a smirk, "things we would just put together so that state authorities would let us move our consignments without troubles." By insisting on the bare materiality of such documents, David's words underscored the insurmountable gap that existed at the turn of the century between the untraceability of *la realidad del monte* and the mere simulacra of document-based technocratic information. Such gap signaled a circulation that was not as much illegal as untraceable, since no conditions allowed for the ultimate determination of either legality or illegality. All timber in sawmills and warehouses was to be legally backed by documents, but such documents did not (and could not) allow for timber to be followed back to the rainforest.

Yet, by the turn of the century, the insurmountable gap between tropical rainforests and technocratic information was becoming increasingly intolerable at local and international scales. Following the growth of diplomatic and trade pressures to secure the legality of tropical timber in Amazonia, and the rapid massification of GPS technologies in Latin America (Campbell 2015; Hetherington 2014), the early years of the twenty-first

century witnessed an unprecedented number of technocratic reforms aiming to expand state data infrastructures onto the previously untraceable terrain of Amazonian rainforests. As local institutional innovations, foreign aid projects, multilateral commitments, and international trade regulations increasingly framed tropical rainforests as spaces that needed to be regulated according to transparent systems of traceability, a temporal cleavage started to insinuate itself as promoters of novel technocratic reforms rebelled against a past associated with corruption, illegality, and deceit.

But while state technocrats advanced such teleologies of progress as a way to advocate for the necessary transformation of tropical rainforests into traceable spaces of technocratic transparency, loggers and timber tradespeople like David articulated an imagined past as they nostalgically longed for a world where, paraphrasing Hugh Raffles, “the softness of biological contours could not become bludgeoned into integers” (Raffles 2002, 169). In such recollections, *la realidad del monte* emerged as a fantasy that celebrated the visceral experience of the frontier as a space of excess that could not be reduced to document-based technocratic information (see Tsing 2005). Importantly, such fantasy only became meaningful as the romantic rejection of a temporality of inevitable technocratic progress (see Boym 2001, xv). In such context, the technocratic expansion of state data infrastructures into Amazonian rainforests not only initiated a time of increasing friction between *la realidad del monte* and document-based technocratic information. For David’s family, as for hundreds of other timber tradespeople and loggers in the region, it also imbricated their lives in a temporal rupture where tropical rainforests came to be increasingly entangled in the larger calculative anxieties of the global environmental crisis.

3. A forest of traceable points

In the early 2000, Peru rapidly entered the technopolitical orbit of a new set of international processes aimed at recasting tropical rainforests as global technologies of climate change mitigation and biodiversity conservation, a process that radically transformed the conditions upon which forest facts could be produced in the governance of Loreto’s tropical logging industry. With the establishment of a new forestry regime promoted by environmental NGOs, technocratically inclined foresters and foreign aid agencies such as USAID and USFS, the Peruvian state came to envision Amazonian rainforests in ways that performed a radical historical break with respect to the past untraceability represented by David’s *realidad del monte*. And so, as tropical rainforests rapidly moved from the peripheries of state infrastructures of technical legibility to become the objects of some of the most ambitious technocratic interventions triggered by the global environmental crisis, the inscrutable density of the Amazonian rainforest was recast as a dense but calculable forest of traceable points.

Instead of the thousands of unsupervised logging declarations that proliferated in Loreto during the late twentieth century, the space imagined in this new technolegal regime was a system of large-scale and capital-intensive logging operations whose productivity was to be pursued on the basis of management plans prepared through systematic surveys of the rainforest. Importantly, such management plans did not establish a general relation between abstract timber volumes and an untraceable area in the rainforest, as prior declarations had done. Rather, they disaggregated timber

volumes into a constellation of traceable individual trees. In such model, each tree came to be represented as a specific timber volume attached to a specific geotagged location that could be, at least theoretically, visited and verified by state authorities. Accordingly, the enduring vision of tropical rainforests as spaces external to technocratic legibility was suddenly eroded by the technical possibility of plotting logging operations as spatial constellations of timber volumes attached to traceable geotagged locations.

At this juncture, FTP emerged as the privileged accounting infrastructures that allowed timber volumes to be traced to and from these various geotagged locations. In such novel technocratic arrangement, FTP would not merely work as legal dissimulations in the service of timber tradespeople eager to legalize their otherwise untraceable timber. Rather, they became means to bound loggers and tradespeople to the promise that all and any specific log could ultimately be traced back to a specific geotagged location in the rainforest. Once state authorities approved a management plan in favor of a given logger, therefore, what they granted them with was the right to harvest and transport a volumetric magnitude of timber resulting from the aggregation of the timber volumes associated to each of the trees they had previously surveyed and declared. And each time loggers or timber tradespeople would transport a timber consignment, FTP would serve as a way to declare the mobilization of a portion of such magnitude, thus allowing state authorities to keep track of the legality of their operations.

In the early years of the twenty-first century, the expansion of this new accounting infrastructure was followed by various forms of public rejection all across the Peruvian Amazonia. In Loreto, however, resistance reached unexpected dimensions when a series of public demonstrations and calls for popular insurgency were led by regional guilds of loggers and timber tradespeople. After a series of protests that included the setting on fire of various public buildings, the Peruvian state even decided to postpone the establishment of large-scale logging concessions in Loreto until 2004, when the new system was finally enforced throughout the region. For several international experts, NGOs and foreign aid agencies, the ultimate implementation of this new forestry regime amounted to the rise of a novel future where Peru's tropical rainforests could be governed according to the emerging standards of environmental transparency and accountability that were starting to take hold in the early 2000s. For many of the loggers and timber tradespeople I talked to across Loreto, however, such regime became a new iteration of old regional and anti-centralist struggles by which metropolitan technocrats in Lima and elsewhere continued to ignore *la realidad del monte*. Consequently, they sought to resist such technocratic interventions not only by publicly protesting against the new forestry regime, but also by finding ways to colonize such forests of traceable points with the very practices of dissimulation and manipulation that were now supposed to be left behind.

4. Buying and selling abstractions

During the early years of the twenty-first century, FTP were thus infused with an ambivalent political temporality manifested in the disparate ways they came to be envisioned as material and informational objects. In contrast to the genres of technocratic documentation that had proliferated across Loreto's tropical timber supply chains in the late twentieth century, FTP were explicitly designed to allow for the formation of traceable forest

facts across time and space. To the extent that FTP associated each log with a precise timber volume and with a code that could be used to trace the geotagged location of its origin tree, they were made to serve as means to keep track of how much timber volume was coming out of the rainforest, and from which specific locations. If tropical rainforests were now envisioned as a constellation of geotagged locations associated to particular timber volumes, FTP were thus to become the accounting infrastructures by which such pointillist space could be made traceable, as state authorities could now keep track of how much tropical timber was moving out of the rainforest at different temporal and spatial scales.

After loggers and timber tradespeople attested to the legality of their consignments by providing FTP to state authorities stationed along the major rivers of Loreto, state representatives would bring that information to the Forestry Bureau in Iquitos so that all records on the flows of timber volumes across the region could be processed, examined, and aggregated in a centralized digital database. At this point, the aggregation of FTP was to give way to the purely numerical realm of digital accounting, where data could easily be analyzed along a variety of lines, including the name of the authorized logger, the species of the logs, the geographic origin of the consignment, and the date of the harvest. By means of such massive process of systematic aggregation, state authorities could ideally begin to answer different kinds of mundane calculational questions: How much timber volume did a particular logger mobilize in the first quarter of the year? Is the critically endangered *Shiwawaco* tree being overharvested according to its currently known populations? Or, as Teran himself asked at the beginning of this article, how many cubic meters of timber were harvested in Loreto last year? By answering such questions, state authorities brought hundreds of logging operations under the grip of state data infrastructures, thus rendering the tropical rainforest into traceable spaces of technocratic transparency.

And yet, as Teran's words also reminded us of, such technocratic efforts to imagine a future of technocratic transparency in the rainforests of Loreto have been enduringly troubled by the possibility of FTP to be manipulated. For as information began to flow from all over the region into the offices of the Forestry Bureau in Iquitos, it was not dematerialized bits of data what needed to move, but physical pieces of paper that came to interact in various ways with the unpredictable postcolonial geographies of Loreto. As Peru's new forestry regime consolidated in the early 2000s, therefore, all FTP collected by state authorities were to be physically brought to Iquitos in order to centralize forest information in a single digital database lodged in Loreto's Forestry Bureau, a journey where FTP would become vulnerable to different sources of manipulation and deceit.

And so, as FTP began to materially circulate across the region in the first decade of the twenty-first century, the infrastructural conditions that were prevalent in most of Loreto complicated their lives as efficient informational objects. Amidst a general absence of internet and telecommunication services in a territory slightly larger than contemporary Germany, state officers stationed all over Loreto were forced to send packages of FTP via large fluvial vessels that would take days or even weeks to reach Iquitos. In such conditions, documents were perennially exposed to the dangers of humidity, robbery or misplacement, turning the transmission of technocratic information into a precarious process where FTP became vulnerable to the unpredictable whims of fluvial transportation and

the treacherous alterations performed by interested loggers. Once FTP arrived to the Forestry Bureau, the absence of precise protocols on how to manage the outstanding amounts of paper arriving at the office would overwhelm archivist attempts to impose order onto such material flows, thus creating the messy bureaucratic landscapes that plagued Teran's desk at the beginning of this paper.

Importantly, as soon as information would enter the Forestry Bureau's digital database, new forms of uncertainty and misunderstanding would arise. Francisco, a senior IT specialist working for Loreto's Forestry Bureau, described to me how the FoxPro platform that was created in 2003 to process all FTP information arriving to the office was plagued by unexpected accounting glitches that nobody knew how to explain. "The system was absolutely broken," he told me, as he struggled to open the old program in his computer. "Sometimes, you updated the amount of timber volume that had been mobilized by a given logger, and a couple of days later the update would not show." Furthermore, to the extent that the database was an offline platform with no interoperable links to other offices outside Iquitos, the production of even these dubious hyper-facts about Loreto's tropical timber would come to depend on the fragile preservation of one single computer upon Francisco's desk.

But the uncertainties and fragilities associated to the circulation of FTP across Loreto were not even the largest threats to achieving the promise of transparency championed by state technocratic reformers. For even before FTP would be sent to Iquitos and apparently dematerialized as numerical information lodged in a precarious digital database, their ability to serve as reliable accounting infrastructures was troubled by the development of a vast array of manipulative practices of trickery and deceit that brought together loggers, timber tradespeople, and state officers across the region. And so, as Peru's new forestry regime established a system of large-scale logging concessions that could be plotted as constellations of geotagged locations, the expanding circulation of FTP to keep track of such novel spaces ended up creating a black market where authorized loggers, sometimes impoverished entrepreneurs without the means of even visiting their remote concessions, would sell "their volume" to timber tradespeople that would continue to fund *habilitación* relations via networks of middlemen (like David's father) all over Loreto.

An interesting slippage took place at this point in time, as FTP increasingly came to stand for the abstract timber volumes that they allegedly represented on paper, thus they became themselves increasingly valuable commodities that would be sought after by timber tradespeople interested in legalizing their timber consignments. In this way, "buying" and "selling" abstract timber volumes became common practice across Loreto's tropical timber supply chains. Once a log raft began its travel from remote areas of the rainforest into sawmills and ports, middlemen would find out which authorized logger had "available volume" of their species of interest and proceeded to buy FTP from them. The expansion of this black market of abstractions engendered new practices of deceit and trickery like *ruleteo* (using the same FTP twice to transport different timber consignments) or *blanqueo* (legalizing logs coming from an unauthorized logging site with a bought FTP). Testimonies of former middlemen in this system point to the subtle ways in which, in the rare occasions where authorities were not already compromised, the stories told by an FTP (what area a particular timber volume was allegedly coming from, for instance) would be carefully synchronized with the physical movements

of a timber consignment that was coming from elsewhere. In time, this created a sophisticated network of coordination between loggers, timber tradespeople, and state clerks from the Forestry Bureau that gradually expanded all across the region.

In this context, FTP acquired during the early years of the twenty-first century an aura of skepticism and suspicion that still haunts them to date. The almost ubiquitous illegality of Loreto's tropical logging industry was not precisely a public secret in the sense of being a truth known to everyone but that could not be named (see Taussig 1999). Rather, illegality acquired a cynical, tinkering affect that involved a distinctive masculinist celebration of the tropical timber trade as an industry rivaled with state authority and regulation. In turn, such disposition engendered a whole set of expressions and comical tropes that came to permeate the regional lore of Loreto, from cumbia songs to folktales, and from village gossip to sudden altercations. The enduring affects of such various expressions reinforced a distinctive temporality where *la realidad del monte* persisted beyond the ability of state reformers to consolidate tropical rainforests as spaces of technocratic legibility. As accounting infrastructures called to be the foundations of a technocratic aspiration towards traceable forest facts, FTP have thus emerged in the last twenty years as terrains where the persistence of an untraceable past comes to encounter the future-oriented aspiration of ultimately bringing tropical rainforests into the orbit of emerging modes of global environmental governance.

5. Concluding remarks

A few months after I spoke with Teran at Loreto's Forestry Bureau, I encountered FTP once again as I traveled with Umberto, a state logging supervisor, to a remote Indigenous village where we were to determine the legality of a timber consignment that had recently been exported to China. As state authorities had determined the information listed in such FTP to be suspicious, Umberto had begun the arduous process of tracing such volumes back to the Indigenous village where its associated logging operation had been authorized last year. To our surprise, however, once we arrived to the Indigenous village, we discovered that nobody knew anything about a logging operation taking place in their land. As we gathered the facts and tried to make sense of the situation, it eventually became clear that a former Indigenous leader had made a secret pact with a timber tradesperson in order to formally involve the Indigenous village in a logging operation without telling anybody about the matter. Importantly, such an arrangement was not about getting timber, since no logging operation had ever been pursued. Rather, it was about getting FTP that could later be used by the tradesperson to legalize timber consignments that were harvested elsewhere. "It is a pity, you know" Umberto said, as we lamented the situation together, "because nobody will care about what the Indigenous village says. In these situations, it is documents that do the talking."

Umberto's reconstruction of this illegal scheme allows us to consider how the political dilemmas of FTP have unfolded over the last decade as the Peruvian state has accelerated even more its technocratic expansion onto tropical rainforests. In response to the unruly black markets of FTP that proliferated in the early 2000s, a series of additional reforms have been advanced upon Loreto's tropical logging industry. These reforms include the development of on-site state supervisions in the rainforest where a renewed state agency, OSINFOR, was given the mandate to conduct field supervisions that could

confirm what was reported in management plans and FTP. Accordingly, what ensued over the 2010s was a cataclysmic process for Loreto's tropical logging industry, where dozens of logging operations were sanctioned following the systematic exposure of the industry's outstanding levels of illegality. If up to this point management plans could be manufactured "on desk" by plotting arbitrary constellations of geotagged locations, the growing empowerment of OSINFOR led to a process by which state on-site supervisions systematically dismantled the manipulative practices of trickery and deceit that had grown around FTP in the early years of the twenty-first century.

In this context, the tropical rainforest was consolidated as a traceable space of technocratic transparency where FTP could work as reliable testimonies of verifiable facts on the ground. For it was not only that FTP could now be inspected as reliable bits of information by tracking the timber volumes they listed all the way back to the geotagged locations where their origin trees were supposedly located. Rather, the last ten years have witnessed a significant increase in foreign aid-supported digital innovations in cloud computing, rural satellite internet infrastructure, and data mining. Together, such innovations reiterate the promise to ultimately transform the accounting infrastructures of Loreto's tropical logging industry into a real-time cybernetic system where hyperfacts about the whole region can be established with certainty. Through such technocratic interventions, the miscommunications and trickeries associated to the manipulable materiality of FTP are to be superseded by the ever-expansive dematerializing power of digital innovations. And so, the enduring untraceability of *la realidad del monte* is to finally be made the past of a future where tropical rainforests can rise as a global environmental technology in the age of climate change and biodiversity loss.

But today, such futures are still haunted by untraceable pasts. For as Umberto's unfortunate discovery shows, FTP are still exploited by loggers and timber tradespeople via ever more sophisticated practices of trickery, manipulation, and deceit. As Amazonian rainforests rapidly move from the margins of state infrastructures of technocratic legibility to the centerstage of emerging modes of global environmental governance, FTP continue to be unexpected sites where to appreciate the tense political temporalities brought forth by our time of global environmental crisis. For if climate change and biodiversity loss are defined by the ontological condition of making the world less predictable, patterned and scalable, they are also defined by a rising epistemic promise to render facts increasingly standardized, coordinated, and verifiable at new local and planetary scales.

Understanding the rise of such paradoxical planetary conditions constitutes a critical step to consider the future of technocratic facts both in Amazonia and beyond. As the epistemic demands of climate change and biodiversity loss strive to render the Earth itself into a computable environment (Edwards 2010; Gabrys 2016), traceability is emerging as a fundamental condition of facticity that drives the expansion of state data infrastructures onto previously untraceable terrains. And yet, following humble documents like FTP may allow us to appreciate the ambivalent ontologies by which new traceable facts are constituted, thus eroding the teleologies that organize dominant understandings of global environmental governance today. If temporality is not a discrete succession of events, but a centripetal field of force where pasts and futures can converge and collide in everyday experience, even humble pieces of paper can thus become sites where to appreciate the larger dilemmas of facticity that accompany our time of global environmental crisis.

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